



Analgesia

A prospective audit on patient satisfaction with postoperative analgesia in a South African Tertiary Hospital

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1. Declaration

I, *CVO WESTHUYZEN*....., hereby declare that the work on which this dissertation/thesis is based is my original work (except where acknowledgements indicate otherwise) and that neither the whole work nor any part of it has been, is being, or is to be submitted for another degree in this or any other university.

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2. Abstract:

Background:

The vast majority of patients will be admitted to general wards after their surgical procedures. Ward staff will provide the prescribed analgesia. The researchers would like to ascertain whether the patient population is satisfied with the analgesia that they receive.

Methods:

Fifty two postoperative patients consented to taking part in a prospective audit that enquired about pain using a Numeric Rating Scale (NRS) on discharge from the theatre recovery room as well as on day one postoperatively. Additionally patients were asked to indicate whether the analgesia was 'good', 'fair' or 'poor' and were interviewed about their expectations regarding pain.

Results:

The mean age was 45 (SD 14) years and median surgical duration was 100 (IQR 75-150) minutes. Mean NRS score was 3 (SD 3) on discharge from recovery as well as on day one postoperatively. 'Good' analgesia was reported by 69.2% of patients and 71.2% reported that they had less pain than expected. The median time from recovery room discharge to first dose of analgesia was 135 (IQR 65-400) minutes.

Conclusion:

Sixty seven per cent of patients indicated that they were satisfied with the analgesia provided. There are, however, still problems with long waiting times to first doses of analgesia. The relatively low overall pain scores and high levels of satisfaction are encouraging.

2. Study Protocol:

Introduction:

In the tertiary institution chosen for this audit, surgery is performed on a large number of patients with a diverse spectrum of disease and comorbidity. Although the traditional aim is to have good clinical outcomes, other factors such as adequate analgesia and the presence of medication side effects should be considered in determining patient satisfaction.

It has been proven that patient expectation plays a significant role in the overall experience of a hospital admission.¹ Only when patients are asked about this, will the medical providers be able to decide if these expectations are met. Furthermore, the overall feeling of satisfaction is influenced by the emotions of the patients themselves as well as the interpersonal relationships between the patients, family members and medical staff.²

Perioperative adverse events – pain and nausea and/or vomiting in particular – have a strong association with the degree of satisfaction with the medical service.^{3,4} The episode of worst pain during an admission will often carry a substantial amount of weight.⁵ In knowing this, there is an opportunity to quantify what would normally be a rather subjective appraisal of the service delivered.

Literature suggest that up to 80% of patients will have acute pain postoperatively. Of these patients up to 86% will experience their pain as moderate to severe.⁶ There is further evidence that patients reliant on oral and intramuscular analgesia alone are at much greater risk to suffer moderate to severe pain in the postoperative period.⁷

Many tools can be used as measurement and results obtained through commonly used pain scales such as the Visual Analogue Scale (VAS) and Numeric Rating Scale (NRS) correlate well.⁸

Patients being cared for by an Acute Pain Service (APS) are more likely to receive regular analgesia than those receiving conventional postoperative care and when this APS is anaesthetist based, there will be a further decrease in pain scores, opiate related side effects and days of admission.^{9,10}

Currently the APS is limited to High Care Units (HCU) and a small number of ward patients. Patient Controlled Analgesia (PCA) devices are being used more often, but is not standard of care. Providing the prescribed analgesia to patients (and treating adverse events) is still the responsibility of ward staff.

As to the primary objective of this audit, the authors wish to quantify patient satisfaction with the analgesia they receive during their postoperative admission.

Study design:

This study will be structured as a prospective clinical audit with the aim of determining patient satisfaction with their postoperative analgesia in a tertiary level hospital.

The outcome of this audit will be to determine what proportion of patients have moderate to severe pain postoperatively as we know that postoperative pain is a significant predictor of patient satisfaction.^{3,4} Collected data will look at patient pain scores on discharge from the recovery room as well as on the first day after surgery. The goal is to look at patient experience and satisfaction and not to compare pain levels experienced after different types of surgery or to compare analgesic regimens.

The authors will use a Numeric Rating Scale (NRS) scored from 0-10 to quantify pain in the patient population. Zero being no pain and 10 being the worst pain imaginable. The following scoring intervals will be used:

- 0-3 mild pain.
- 4-6 moderate pain.
- 7-10 severe pain.

These intervals correlate well with cut-off points determined by asking healthy, pain free individuals what they would see as mild, moderate and severe pain on a NRS.^{11,12}

In addition to this, patients will be asked the following:

- Are you satisfied with the analgesia provided?
- Did you expect to feel as much pain as you did? Did you expect more or less pain?
- Were you nauseous or did you vomit after your surgery?

Furthermore, the audit aims to determine what proportion of patients receive paracetamol as part of their premedication.

The standard of intraoperative analgesia for this patient population will be:

- Intravenous opiates.
- Neuraxial techniques (Spinal or Epidural Anaesthesia).
- Occasional peripheral nerve blocks (Deposition of local anaesthetic in the region around a peripheral nerve, blocking sensory innervation).
- Non Steroidal Anti Inflammatory agents (NSAIDS) rectally (not routine).
- Intravenous paracetamol (in selected patients only, not routinely used).

Postoperative analgesia will include the following:

- Oral Paracetamol (occasionally intravenous).
- Oral NSAIDS (occasionally intramuscular).
- Intramuscular opiates.

An effort is made to provide every ward patient with multimodal analgesia, providing there are no contraindications to the use of a specific group of analgesics.

Methodology:

The aim is to interview patients undergoing elective surgical procedures. Disciplines involved will be General Surgery, Gynaecology, Orthopaedic Surgery, Thoracic Surgery, Ophthalmology, Urology, Otorhinolaryngology and Plastic Surgery. Male and female patients older than 18 years of age that are admitted to a general ward postoperatively will be eligible. Patients must be able to understand and communicate in English. No day case surgery or patients from High Care Units or Intensive Care Units will be included. Patients receiving repeat procedures will be excluded.

Collection of data will be done by the researcher and supervisor.

Patients will be recruited from the waiting area outside the theatre recovery room. From here they are taken to the ward where the full enrollment and discussion around the research process, including informed consent, will take place the next day.

The research will be conducted by means of a questionnaire (please see attached document). Pain will be scored by a simple pain score (NRS) of 0-10 with zero being no pain and 10 being the worst pain imaginable. Consensus is that a score of ≥ 4 out of ten should warrant intervention.¹¹ The questionnaire will include the following information from the stay in recovery room:

- Patient details (hospital label preferable).
- Procedure performed.
- Type and duration of anaesthesia.
- Pain on discharge from recovery room.
- Perioperative analgesia.

The following information will be collected during a ward visit on the first day postoperatively (from 08:00 to 12:00 and collected by the researcher or supervisor):

- Patient experience of pain control since ward admission – was the analgesia ‘good’, ‘fair’ or ‘poor’?
- Does the patient feel that he/she should have received more analgesia?
- Did the level of pain meet expectation? Or was it less or more than expected?
- Pain score at the time of the interview (as scored on the NRS).
- Was there any nausea and/or vomiting?

- Time of first dose of analgesia (post recovery room discharge).
- Doses and dose intervals of analgesics.
- Problems or comments specific to a case.

Patients participating in the audit will be required to provide written, informed consent. The Consent Form has included information and discussion as is required by the Human Research Ethics Committee of the University of Cape Town. Please refer to appendix C, page 34.

Should a patient have moderate to severe pain postoperatively, needing treatment, the clinician involved in the gathering of information will prescribe the necessary analgesia. This action will be noted.

Ethical Problems:

Identifying pain and neglecting to treat it adequately is a potential concern.

The clinicians involved in patient management will be asked to prescribe analgesia to patients as they would usually do postoperatively. This approach would ensure that the process is at least as efficient as during normal postoperative care.

If any patient complaints were to arise, they should be dealt with through official channels, i.e. Hospital Management and/or the Health Professions Council of South Africa.

The research is a clinical audit only and no part of the project will pose a threat to patient health, safety or wellbeing.

Patients do not require any follow up appointments for the purpose of this research.

Timetable:

The aim is to interview patients over a period of three months from 15 April 2014 to 15 July 2014.

Data Protection:

Data collection sheets (see attached form) will be completed in the recovery room and stored in a locked filing cabinet to which only the researcher has access. Once collected, the documents will be taken to the patients' bedside, the second half completed and then stored in the same filing cabinet.

Captured data will be stored electronically. This will be done on the investigator's password protected personal computer until such time as the data collection phase is complete and statistical analysis is commenced. At this time data will be handed over to the relevant statistician and a similar level of protection of data will be required. Statistical analysis will be performed using SPSS v.22.0 for Windows. Non-normally

distributed variables will be compared using Kruskal-Wallis Tests. Categorical data will be compared with Chi-squared tests and Fisher's exact test.

No data of a specific patient is to be handed to a third party, unless it will directly affect the patient's clinical management.

Patients' personal details will be kept as part of the research record. No personal details that can identify a patient will be included in any statistics handed in for evaluation or publication.

The data protection and privacy strategy complies with the principles of the Declaration of Helsinki.

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3. Literature Review

Introduction:

For the purposes of this audit on postoperative pain the authors will be evaluating the service at a tertiary level university hospital in Cape Town, South Africa. In this facility services include General surgery, Orthopaedics, Gynaecology, Ophthalmology, Neurosurgery as well as Cardiothoracic surgery and Ear Nose And Throat surgery. General surgery incorporates Trauma, Emergency and Vascular surgery sub-specialties.

In spite of the wide variety of surgical services offered in more than twenty operating theatres daily, High Care Unit (HCU) or Intensive Care Unit (ICU) beds are relatively limited. As a result of this the majority of patients will not receive the benefit that specialized care and analgesia services could provide. These patients will be admitted to general wards and the provision of analgesia will be the responsibility of nursing staff - with doctors available for guidance. The use of the Acute Pain Service (APS) is limited to patients that will need more specialized analgesia, but who are not admitted to a specialized care area. This is due to the fact that the APS is a very new commodity in this center. The current arrangement is that the registered nurse (RN) dedicated to the APS and the anaesthetist on duty in the main theatre recovery room will do pain rounds twice daily. During these rounds the APS will follow up and advise on patient controlled analgesia (PCA) devices, revise analgesia regimens and provide additional support to ward staff in their efforts to provide effective analgesia to the patient population.

International literature suggest that up to 80% of patients will have acute pain postoperatively (approximately 86% of these patients have moderate to severe pain in a large set of data from the USA).¹ The concern is that postoperative pain is similar in the institution chosen for this audit. In fact, there is daily anecdotal evidence from surgical colleagues – in particular Orthopaedic surgeons – that the patients admitted to their wards have high levels of pain. This will impact negatively on patient mobilization, rehabilitation and thromboembolic side effects. In addition to this, the stress related cardiovascular effects and cardiac morbidity must not be forgotten. Furthermore, the worst pain of the hospital stay will often impact significantly on patient satisfaction.² In order to quantify the extent of the problem, the decision was made to audit patient satisfaction with postoperative analgesia.

The remedy to the problem – should the audit show this - might well lie in the better utilization of an anaesthetist based APS as evidence points towards decreased pain scores, decreased complaints regarding opiate related side effects and a decreased length of hospital stay.^{3,4} This will not only provide greater patient satisfaction, but could lead to significant cost saving efforts. Education of nursing and medical staff

on the value of the APS as well as the importance of timely, multimodal analgesia will undoubtedly benefit our patient population.

The aim is also to provide evidence to expand the current APS, should the data suggest that the patient population is not satisfied with the service rendered.

Method:

The literature search was conducted using Medline to search the National Centre for Biotechnology Information (NCBI) databases for relevant scientific papers.

Using the search parameters “patient satisfaction AND postoperative pain” with filters applied for English language, Title/Abstract and adult patients, 1553 papers were identified initially. Papers were included in the literature review if they specifically investigated patient satisfaction regarding pain and pain relief in a general population. When studies employed specialized analgesia or nursing care, or when predetermined analgesic regimens were being compared, the studies were excluded.

The majority of studies reviewed are prospective audits of practice or cohorts of patients interviewed regarding their pain experience. There are, however, a small number of studies that collected data retrospectively.

Fourteen sets of data have been included for review.

Review:

Myles and colleagues conducted a prospective analysis of quality improvement data collected from 10811 patients in an Australian tertiary level hospital.⁵ The majority of these (85%) were admitted for elective surgery. During these interviews the authors interviewed patients within 24 hours of surgery and the major subjective outcome was patient satisfaction. Minor outcomes included nausea and vomiting, pain, intraoperative awareness and complications.

During the analysis the factors most closely associated with patient dissatisfaction were (in order of importance):

1. Intraoperative awareness.
2. Severe nausea and vomiting.
3. Moderate to severe pain.
4. Postoperative complications.

Patients were also asked to rate their satisfaction with the anaesthesia service (not the entire hospital stay), to grade their pain control and to recall the severity of their nausea and vomiting. A large percentage of patients (96.8%) were satisfied with their anaesthetic service while 2.3% was somewhat dissatisfied and 0.9% was dissatisfied. The dissatisfied group tended to be younger and have shorter surgical duration.

The interviews for this study were structured as personal interviews with patients and although it has the potential to add benefit in terms of patient care, one has to be mindful of the fact that patients could possibly tailor their answers in an attempt to please interviewing staff. Concerns were also raised about the lack of expectations from a patient perspective, i.e. patients do not know what to expect. If this is the case, it could be difficult to form an accurate opinion regarding satisfaction with the service.

Vijayan, Tay, Tan and Loganathan in Kuala Lumpur did a further study in the setting of a tertiary hospital.⁶ This included 183 postoperative patients that were asked, via a standardized questionnaire 24 hours postoperatively, to rate pain relief on a Visual Analogue Scale (VAS) from 0-10 as well as to say whether they were satisfied with the level of pain relief or not. If not satisfied, they had to provide one of four reasons:

1. Analgesic injections not given.
2. Analgesic injections not given promptly when requested.
3. Analgesic injections given, but not effective.
4. Did not want injections.

The results from this showed that 37% of patients had moderate to severe pain (VAS >6) and that 32.7% were unhappy with their pain control. As many as 41.7% of patients received no parenteral analgesics postoperatively and 23% of study participants had no analgesia written up. No day cases were included in the questionnaire.

Of interest here is the mean population age of 41 years. This is a relatively young group of patients undergoing inpatient procedures and participants were as young as 12 years of age. Another concern raised by the authors was the fact that opiates were not given due to the fear of addiction and fear of respiratory depression.

The use of the American Pain Society's Patient Outcome Questionnaire in evaluating the quality of postoperative pain management has also been described.⁷ Dihle, Helseth, Kongsgaard, et. al. described the use of this in a group of 176 Norwegian patients that underwent orthopaedic surgery and the general consensus was that pain was undertreated - Numeric Rating Scale (NRS) scores >5/10 - and had a deleterious effect on function in the first five days after surgery. Contrary to these findings, patients reported high levels of satisfaction with postoperative pain relief. Eighty seven per cent of patients reported to be either 'satisfied' or 'very satisfied'.

During this study patients received only non-specialized analgesic regimens as dispensed by ward staff – no patient controlled analgesia (PCA) or epidural analgesia was used postoperatively. Only 50% of oral analgesic doses (paracetamol and NSAID's) were administered during the admission period. This is of great concern and seems to be a fairly common problem.

This study has however included a homogenous group receiving hip or knee arthroplasty and the extrapolation to the wider surgical population could be questioned. The fact that patients are satisfied with pain relief in spite of high pain scores is an important finding.

Tocher and colleagues followed a different approach towards finding a group of surgical patients that would be more representative of the general population.⁸ A postal questionnaire provided retrospective feedback from 2269 patients treated in three regional centers in the United States and the results showed unacceptable levels of postoperative pain. Just over 90% of respondents reported to have moderate to severe pain in the immediate postoperative period (although this exact time was not well defined). Despite the number of patients reporting high levels of pain after surgery, the majority felt that the amount of analgesia provided was adequate. In fact, 86% of participants were satisfied with the amount of analgesia they received.

Some interesting problems emerged from the 40-point questionnaire. It showed that the patients with enduring pain postoperatively (although in the minority) were the most critical of the system and were the ones most likely to report dissatisfaction with analgesia. To add to this, it became clear that doctors providing care postoperatively are often relatively junior staff and have very little experience in managing acute pain. This will certainly impact on drug choice, drug combinations and dosing of drugs deemed essential to postoperative analgesia.

When looking at the data collection in detail, however, one has to question the validity of some of the findings. Participants for the study were identified from the questionnaire by determining whether they had 'surgery' or a 'procedure'. This was an entirely subjective answer by the person completing the questionnaire. To add to this the patients were asked to recall their levels of pain during their hospital stay of up to two weeks previously. This could possibly create some recall bias.

This series included elective surgery as well as emergency cases. It is perhaps important as emergency cases often yield less time to plan analgesia and potential haemodynamic instability limits options available to treating physicians.

Preceding Tocher's study by almost 12 years was a small pain survey done by Corizzo, Baker and Henkelman.⁹ One hundred and fourteen patients from three Louisiana hospitals were interviewed and of this group 68 were inpatients. The inpatient group was interviewed after admission for postoperative care. Pain scores were NRS based and satisfaction rated on a six point scale ranging from one being 'very satisfied' to six being 'very dissatisfied'.

During their interview the authors found that 90% of inpatients had acute pain during the interview with mean NRS scores of 4.25 (SD = 3.04). Of this group only 37% received analgesia within 15 minutes of a request for treatment. It was found that there was a moderately strong association between pain relief and satisfaction. This could be seen in the mean satisfaction scores of 4.51 (out of a total of 6).

The aforementioned group consisted out of mainly educated Caucasian patients and it is possible to argue that the results cannot be extrapolated to the broader population. The inclusion of outpatients – mostly with chronic cancer pain - casts some more doubt over the suitability as a comparison to data sets regarding postoperative pain.

Patient satisfaction with acute pain management is also studied in other areas. Although the aim of our survey is to quantify patients' satisfaction with pain relief after surgery, the work done by Shill and colleagues in an Emergency Department (ED) trial showed a strong association between patients' satisfaction and good analgesia.¹⁰

Included in the prospective cohort study, 570 patients were interviewed and 476 were eligible for further participation. Treating staff were not informed about the survey in order to maintain patient care as close as possible to normal day-to-day practice. Adequate analgesia was defined as reduction in NRS to less than four (out of 10) and by reduction of trauma pain score by two or more points. The criteria were met by 207 (43.5%) patients and 190 (39%) of patients were 'very satisfied' with their analgesia. Satisfaction was rated on a six-point scale from 'very dissatisfied' through to 'very satisfied'. Analysis showed adequate analgesia to have the strongest association with patient satisfaction (OR = 7.8). Specific communication regarding management of pain and analgesia (OR = 2.3) and oral opioid administration (OR = 2) were also associated with patient satisfaction.

Patients who could not communicate pain scores (incapacitated or comatose) to researchers were excluded from the study group. This could possibly have biased the questioning by including patients that potentially have much less severe pain and thus are easier to manage. Interviewing of participants took place in the ED and added attention in a usually chaotic and time limited environment could play a role in patient satisfaction. Despite some problems, however, this series does give an indication that there is some association between good analgesia and patient satisfaction.

Further work on satisfaction after surgery shows a familiar pattern of patients with high levels of postoperative pain as well as overwhelming satisfaction with their care.¹ This data set was derived from 250 patients interviewed retrospectively by a team of researchers led by Apfelbaum in Chicago, Illinois.

The participants all had surgery within a 5-year period and were contacted telephonically. Only 52% of this group received inpatient care. The rest either had day case surgery (38%) or had minor procedures at doctors' rooms (10%). A common denominator among the group was the expectation to have pain after surgery. Seventy five per cent reported that they expected at least some pain after their procedure.

The results from the survey shows that 86% of study participants had moderate to severe pain postoperatively. This includes day case surgery where patients only had access to oral analgesia. Surprisingly, 90% of respondents reported that they were

satisfied with the analgesia provided during the postoperative period. Once again showing patients with pain that are satisfied with their care.

One must keep in mind that some of the participants had surgery up to five years prior to the interview. The potential for recall bias must be considered.

Jawaid and colleagues showed that 85% of participants in their trial were either 'very satisfied' or 'satisfied' with pain management after General Surgery.¹¹ Of interest here were the relatively low pain scores – as indicated via a Visual Analogue Scale (VAS) from 0-10. The mean VAS at 12 hours after surgery and at rest was 3.85 (SD = 2.45). The authors concluded that their management of postoperative pain was good based on the high levels of patient satisfaction. Interviews were conducted face to face and concerns were raised as to whether this could lead to patients tailoring their answers in order to please interviewers.

There were a number of further limitations. The mean patient age was 35.1 (SD = 14.6) years and the population consisted out of predominantly healthy individuals of ASA class I and II. Only General surgical procedures were performed. This is a very limited patient population and results should be extrapolated with some caution.

More recently a cohort of 573 Danish patients were interviewed on their pain experiences as well as beliefs and attitudes toward pain management.¹² This represents a more heterogeneous group from a large regional hospital. Included were Gastro-intestinal surgery, Gynaecology, Urology and Orthopaedic surgery. Interviews were conducted face to face and 424 patients, all over 18 years of age, consented to participation. Elective surgery accounted for 62.7% of cases.

Of the patients included, 305 had acute pain $\geq 4/10$ on a Numeric Rating Scale. This means that 71.9% of patients of the overall 424 had moderate to severe pain in the first 24 hours after surgery. In spite of this, 88.4% of patients indicated that they were either 'satisfied' or 'very satisfied' with their pain relief.

Of interest here is some additional data regarding the prescription of medication. When drugs were prescribed at regular intervals, patients received 99% of the doses, but only 25% of *Pro Re Nata* (PRN) doses were given. This leaves some considerable room for improvement.

During the same year German literature from a smaller group of patients showed some promising results while comparing good analgesia with patient satisfaction.¹³ All patients underwent Anterior Cervical Spine Decompression and Fusion (ACDF). Correspondents were asked to give pain scores postoperatively and to decide whether their pain relief was 'excellent', 'good', 'moderate' or 'poor'. The overall decrease in NRS was from 6.2 (SD = 2.2) to 2.1 (SD = 2.3) and 67% of patients indicated their satisfaction as being 'good' or 'excellent'.

In contrast to better cervical range of motion and improved neurological function, adequate analgesia was the only factor that had an association with patient

satisfaction. One must however bear in mind that this was a relatively small group of patients that all received similar surgical procedures.

Following on these studies a multicenter audit of patient satisfaction was done by asking 573 patients to rate their postoperative satisfaction on a five-point scale.¹⁴ Due to low numbers in the groups indicating lower satisfaction, the overall cohort was divided into 'completely satisfied' and 'incompletely satisfied'. These two groups were compared to five domains postoperatively:

1. Physiological.
2. Nociceptive – i.e. nausea and pain.
3. Emotive – i.e. anxiety and depression.
4. Activities of daily living.
5. Cognition.

Recovery was defined as the return to baseline functioning or better in each domain.

Incomplete satisfaction at day three after surgery were best predicted by:

1. Persistent pain and nausea at day three.
2. Incomplete satisfaction at day one.

Incomplete recovery in the remaining domains, were not predictors of patient satisfaction.

This study included patients from age six and older and this inclusion must be questioned. The validity of data obtained from young children during face-to-face interviews could perhaps have introduced some bias.

Discussion:

During the course of this literature review it has become clear that patients often have moderate to severe postoperative pain. The reasons for this are numerous:

- Fear of addiction – both by medical staff and patients.
- Lack of knowledge regarding multimodal analgesia.
- Irregular dosing of drugs – often due to 'as needed' or PRN prescription.
- The misconception that pain must be treated when present, rather than taking analgesia as a measure to prevent the occurrence of pain.

When it comes to the question of satisfaction as a surrogate to pain relief, it becomes an increasingly contentious issue. A number of data sets suggest that patients receiving adequate analgesia will equate to patients being satisfied.^{5,9,10} Others are not that clear on the relationship and there is often no good correlation between patient satisfaction and good analgesia. This is highlighted by the fact that patients often indicate high levels of satisfaction with their treatment despite high levels of

postoperative pain. The most obvious reasons for this could perhaps be found in patient expectations regarding pain, i.e. some will not know what to expect, but some will expect the worst case scenario and will eventually experience less pain than expected.

There were some common problems during the comparison of different pieces of literature. International literature reviewed often included both emergency and elective cases. One study was based solely in an emergency department. Comparing the level of satisfaction of these studies to the our patient population that received elective surgical procedures was challenging. The times at which patients were interviewed – both postoperatively and post injury - varied widely. This in itself could pose a problem with interpreting and comparing the available data.

These studies represent a variety of attempts to quantify patient satisfaction with the management of their pain. The patient population groups, ages, surgical procedures (or trauma), sample sizes and data collection methods vary widely between the different investigators. In addition to this, measurement tools for patient satisfaction are not standardized and make the comparison between studies troublesome.

Conclusion:

With the available literature it is clear that patients experience high levels of pain in the immediate postoperative period. Much can be done to improve postoperative pain management and in doing so, improving patient satisfaction.

Standardizing scoring systems for pain as well as satisfaction will be of value in order to better compare differences in patient populations. Future research separating elective surgery, emergency surgery and chronic pain will be needed.

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4. Publication-ready Manuscript

Analgesia

A prospective audit on patient satisfaction with postoperative analgesia in a South African Tertiary Hospital

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Keywords: Pain; Patient satisfaction; Analgesia; Postoperative analgesia; Postoperative pain.

Introduction:

Perioperative events play a major role in how patients perceive the quality of care they receive during a hospital admission.¹ In order to improve the service offered, one has to identify which events play the biggest role and be able to quantify their effect.

Postoperative pain is one such event that has been well quantified and has good, reproducible scoring systems in place.² The episode of worst postoperative pain may well have a tangible impact on patient satisfaction.³ In addition to this, international literature suggest that up to 80% of patients will have moderate to severe pain in the immediate postoperative period.⁴ A recent South African study confirms that this is indeed the case with mean Visual Analogue Scale (VAS) scores ranging from 4-5.1 in the first 24 hours postoperatively.⁵ This leaves a considerable amount of room for improvement (which the authors of this study addressed during the second part of their audit).

Due to the relative lack of data on postoperative analgesia and patient satisfaction in South Africa, the audit of clinical practice was initiated in Groote Schuur Hospital, Cape Town. This is one of three tertiary teaching hospitals in the Western Cape region.

Method:

Ethical approval was granted by the Human Research Ethics Committee of the University of Cape Town (UCT). Data collection took place during the period of 15 April to 15 July 2014 and patients over 18 years of age, capable of conversing in English and receiving elective surgery were eligible. All patients gave written, informed consent. The focus was on patients that did not receive specialized analgesia and/or care postoperatively, i.e. ward patients reliant on nursing staff to provide the prescribed analgesia. Patients admitted to a High Care Unit (HCU) or Intensive Care Unit (ICU) were excluded from the study population, as were patients cared for by the Acute Pain Service (APS). Day cases were not included.

For scoring of pain an 11 point Numeric Rating Scale (NRS) was used. Zero being no pain at all and ten being the worst pain imaginable. Consensus among researchers was that a NRS ≥ 4 would warrant intervention.⁶ The NRS was chosen due to its simplicity as well as the fact that it correlates well with the results from a visual analogue scale (VAS).²

Collection of data was done by the researchers themselves and it took place in two phases. The first phase was recruitment of patients at the time of discharge from the theatre recovery room. This was done while they waited to be transported to the ward

from the theatre waiting area. During this brief interview patients were only asked to score their pain on the NRS. If their scores were four or greater, they would receive additional analgesia prior to discharge. At this time, demographic details and information pertaining to the anaesthetic and surgery were collected. Phase two followed on the first day postoperatively. Patients were interviewed between 8:00 12:00 and they were asked the following questions:

- What is your pain like now? Patients again received additional analgesia if the NRS ≥ 4 .
- How has your pain control been so far?
- Would you have liked more analgesia?
- Did you experience as much pain as you expected? Was the pain more or less than expected?
- Did you experience any nausea and/or vomiting?

Pain control was graded as 'good', 'fair' or 'poor'.

Further information gathered at this time included drugs prescribed for postoperative analgesia as well as the time to first dose of analgesia (from recovery room discharge).

The primary goal in gathering this data set is to gain insight into the proportion of patients that are satisfied with their analgesia postoperatively. In addition to this, pain scores, side effects of medication, premedication and patient expectations will be reviewed.

Statistical analysis was performed using SPSS v.22.0 for Windows. Non-normally distributed variables were compared using Kruskal-Wallis Tests. Categorical data were compared with Chi-squared tests and Fisher's exact test. Descriptive statistics derived from the study population are expressed as number (%), mean (SD) or median (IQR).

Results:

Sixty two patients were recruited into the sample population of which three refused consent and seven were lost to follow up due to early discharge. The remaining sample of 52 patients showed a mean age of 45 (SD 14) years of with 38 (73.1%) females. Twenty (38.5%) American Society of Anesthesiologists (ASA) class I, 22 (42.3%) ASA class II and 10 (19.2%) ASA class III patients were enrolled. This may be due to the fact that ASA class III and higher are more likely to require HCU or ICU care postoperatively. The majority of patients received either General surgery, Orthopaedic surgery or Gynaecological surgery. These disciplines represented 16 (30.8%), 14 (26.9%) and nine (17.3%) patients respectively (Figure 1).

Of the 52 patients only seven (13.5%) received regional anaesthesia (RA) alone. Fifteen (28.8%) received a general anaesthetic (GA) with a supplemental regional

technique and 10 (19.2%) received a GA with local anaesthetic (LA) infiltration of the wound. Twenty (38.5%) patients received a GA alone (Table I, II).

The median duration of surgery was 100 (IQR 75-150) minutes. Postoperatively the median time to receiving the first dose of analgesia after recovery room discharge was 135 (IQR 65-400) minutes. Patients reported mean NRS scores of 3 (SD 3) on discharge from recovery room. On day one of their ward admission the mean NRS score was 3 (SD 3) (Table II). In addition to this, 20 (38.5%) patients had a NRS of zero in the recovery room and another 17 (32.7%) had a NRS of zero in the ward (Figure 2, 3). Paracetamol premedication was administered in 34 (65.4%) of patients.

Table I. Demographics and Surgical Specialties.

		n	%
Gender	Female	38	73.1
	Male	14	26.9
ASA Class	1	20	38.5
	2	22	42.3
	3	10	19.2
Specialty	ENT	3	5.8
	Gynaecology	9	17.3
	Ophthalmology	3	5.8
	Orthopaedics	14	26.9
	Plastic Surgery	2	3.8
	Surgical	16	30.8
	Thoracic	2	3.8
	Urology	3	5.8
	Type of Anaesthesia	General Anaesthesia (GA)	20
	GA, Local Anaesthesia	10	19.2
	GA, Regional Anaesthesia	15	28.8
	Regional Anaesthesia	7	13.5
Paracetamol Premed	No	18	34.6
	Yes	34	65.4

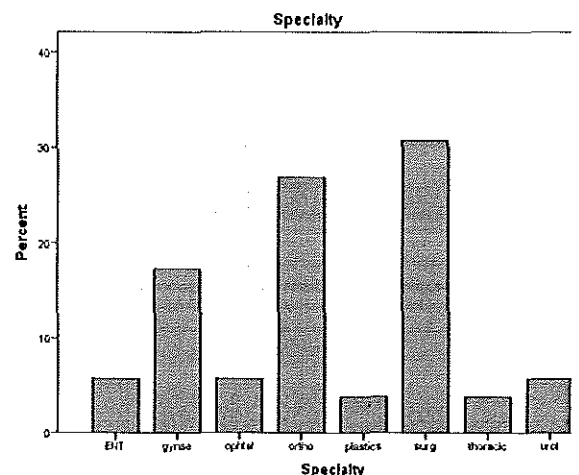


Figure 1: Contribution by surgical specialty.

(ENT = Ear Nose and Throat; Gynae = Gynaecology; Ophtal = Ophthalmology; Ortho = Orthopaedic surgery; Plastics = Plastic surgery; Surg = General surgery; Thoracic = Thoracic surgery; Urol = Urology)

Table II: Age and Surgery Data.

Variable	Mean	Std. Dev.	Min	Max	Median	Percentile 25	Percentile 75
Age	45	14	19	73	45	33	56
Surgery Time (min)	113	65	20	380	100	75	150
Time to first dose of Analgesia after recovery room discharge (min)	277	291	10	1030	135	65	400
Recovery Pain Score: NRS	3	3	0	10	4	0	6
Ward Pain Score: NRS	3	3	0	10	3	0	5

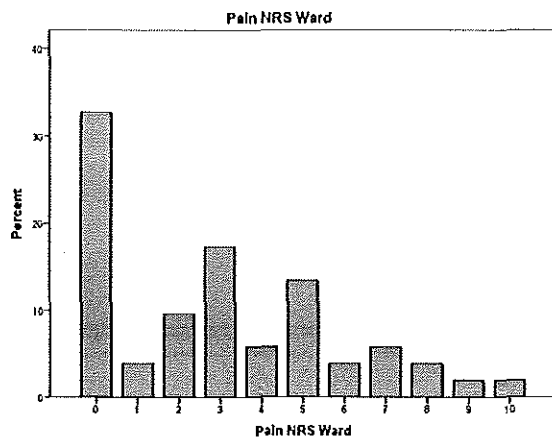


Figure 2: Ward pain score on NRS.

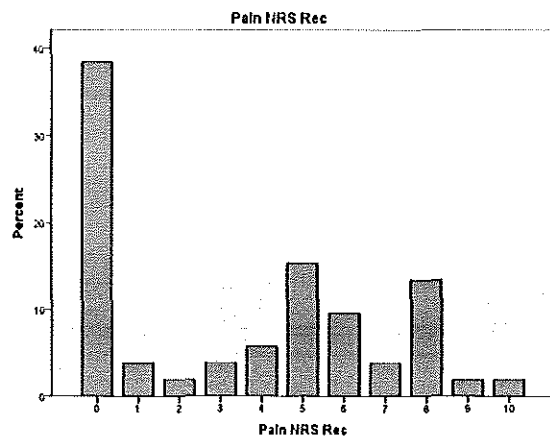


Figure 3: Recovery pain score on NRS.

The overall indication was that of high levels of patient satisfaction with 36 (69.2%) patients indicating their level of analgesia as ‘good’. A further 14 (26.9%) patients indicated a ‘fair’ level of analgesia and only 2 (3.8%) had ‘poor’ analgesia (figure 4).

During further analysis of the questionnaire, it became evident that 15 (28.8%) patients indicated that they would have liked more analgesia. Thirty seven (71.2%) indicated that they received enough analgesia. In keeping with this, 37 (71.2%) of participants experienced less pain that expected during their admission (Figure 5).

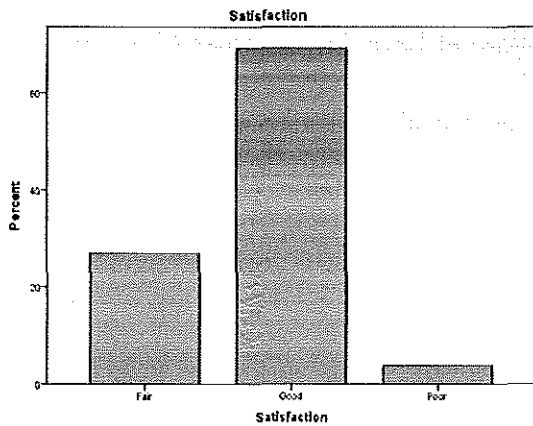


Figure 4: Levels of satisfaction.

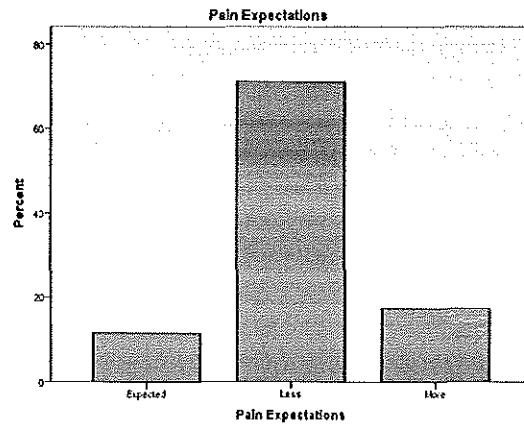


Figure 5: Expectation regarding pain

It is of interest to note that 35 (67.3%) patients did not have vomiting and/or nausea up to and including the time of the interview.

Median NRS values were compared to patients' levels of satisfaction using the Kruskal-Wallis test. Patients that rated analgesia as 'poor' had median NRS scores of 6, compared to median NRS scores of 5 and 2 in the groups reporting 'fair and 'good' analgesia respectively. Although those that reported 'good' analgesia had lower pain scores than the 'fair' and 'poor' groups, the result did not reach statistical significance ($p = 0.057$); (Figure 6). The comparison between time to first dose of analgesia and patient satisfaction is also of interest. Only one patient in the group describing analgesia as 'poor' had data for this (likely due to a missing prescription chart of the other patient), hence only the 'fair' and 'good' groups were compared.

Intervals from recovery room discharge to first dose of analgesia in the ward was a median 238 (IQR 95-703) minutes for patients that rated analgesia as 'fair' and a median of 110 (IQR 53-345) minutes for patients that had 'good' analgesia ($p = 0.154$). The audit was not powered to achieve statistical significance in this case. Seven patients waited longer than 600 minutes for their first dose of analgesia. Three patients from this group reported 0/10 pain in the ward. Only one patient with a NRS score of zero had a regional technique performed.

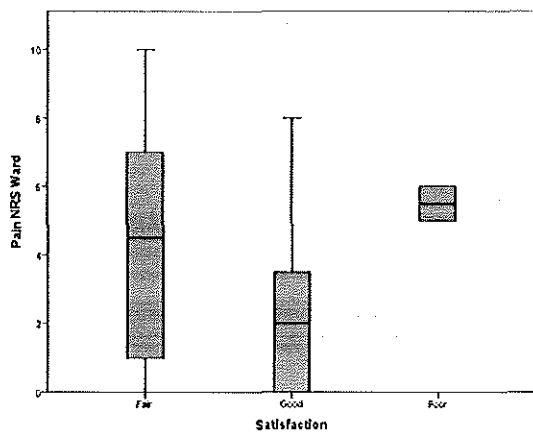


Figure 6: Satisfaction and NRS scores.

When comparing ASA status with patient satisfaction using the Chi-squared test, no patients with ASA class I or II graded their analgesia as being 'poor' ($p = 0.027$). This means that only ASA class III patients graded analgesia as 'poor' (Figure 7).

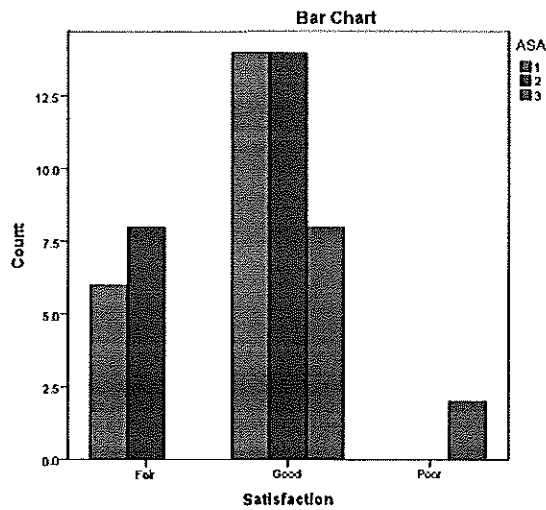


Figure 7: ASA class and satisfaction.

At this time we took the opportunity to compare the use of paracetamol premedication with patient satisfaction using Fisher's exact test. There was no association ($p = 0.809$).

Patients reporting 'poor' analgesia were restricted to General surgery and Orthopaedic surgery. This is, however, the bulk of the patient population and surgical procedures are often extensive.

There was no significant association between the type of anaesthesia received and the level of patient satisfaction ($p = 0.249$), nor was there any association between the use of regional techniques and satisfaction ($p = 0.066$). Both were compared using Fisher's exact test.

Discussion:

Our study population is a relatively young group with a mean age of 45 (SD 14) years and predominantly (73.1%) female patients. The relatively young group accounts, at least in part, for the fact that 42 (80.8%) patients were of ASA class I and II. This population had a variety of anaesthetic techniques employed which included general, regional and local anaesthesia and combinations thereof. The 22 (42.3%) patients that received regional anaesthesia (either alone or in combination with general anaesthesia) are of interest. Despite clinical experience suggesting that regional techniques work well for postoperative pain relief, this group showed no association between receiving regional anaesthesia and satisfaction. This audit was, however, not powered to investigate this adequately.

The interval from recovery room discharge to first dose of analgesia raised some questions during this investigation. The longest interval was 1030 minutes – more than 17 hours – while some patients received analgesia in as little as ten minutes. Following up on this, analysis showed that patients reporting 'good' analgesia had shorter intervals to first dose of analgesia, although this was not statistically significant. Vijayan, Tay and Tan suggested that patient satisfaction will be adversely affected with long waiting times to receiving analgesia.⁷ Corizzo showed a moderately strong association between patient dissatisfaction and waiting

times of longer than 15 minutes for requested analgesia.⁸ It must be acknowledged that auditing waiting times from the request for analgesia to receiving analgesia may be a better tool in evaluating how efficient ward staff are at providing the prescribed analgesia.

The authors believe that excessive waiting times to receiving analgesia (be it from recovery room discharge or from requesting analgesia) can be avoided by the judicious use of the Acute Pain Service (APS) in our institution. This is a commodity that is relatively new and that is still evolving. Keeping in mind that the cost effectiveness and efficiency – with reduced hospital stay and less opiate related side effects – have been proven, the aim should be to expand this service in future.^{9,10} The long waiting times shown here will be of great help when motivating for the expansion of the APS.

The study population reported relatively low pain scores with a mean NRS score of 3 (SD 3). This compares well to results from Jawaid in a study of mainly ASA class I and II patients reporting mean VAS scores of 3.85 (SD 2.45).¹¹ In addition to this, twenty (38.5%) patients had NRS scores of zero in the recovery room and a further 17 (32.7%) reported scores of zero in the ward. In the group that reported NRS scores of zero on day one, four received General surgery, three Orthopaedic surgery, three Gynaecological surgery, three Urology procedures and one each had ENT, Ophthalmology, Thoracic and Plastic surgery procedures. The use of neuraxial techniques can account for the scores of zero in the recovery room, but not for scores of zero on day one postoperatively.

‘Good’ analgesia was reported by 69% of patients. This is in keeping with high levels of satisfaction with postoperative analgesia in the international literature. Myles reported that 96.8% of patients were satisfied with their analgesia in a multicentre audit of nearly 11000 patients. Tocher, Dihle and Apfelbaum conducted three separate, smaller studies and their results showed that 86%, 87% and 86% of patients were satisfied, respectively.^{12,13,14} The general consensus so far is one of good analgesia and patients that are satisfied with the service received. When comparing the satisfaction of our population to the NRS scores, the trend is towards higher satisfaction as the NRS values decline. This association has been shown by Shill and colleagues in a recent Australian study.¹⁵ Our audit was unfortunately not powered to prove statistical significance in this regard.

Patient expectation is another area that was explored in the audit and of interest is the large group (71.2%) that reported less pain than expected. The reasons for this are unclear. Past experience of surgery, emotional factors and the lack of information pre-operatively may all contribute to this. It is possible that the population finds it difficult to form accurate expectations regarding their surgery if they do not know what to expect.

The association between ASA class and satisfaction is a further point for discussion. The general population in this audit consisted only of ASA class I, II and III patients. This data set showed a strong association between ASA class III and patients grading analgesia as ‘poor’. One can only speculate as to why this group was singled out, but the inherent physiological compromise and possibly more invasive surgical procedures could have played a part. In addition to this, ward staff may be reluctant to provide larger doses of analgesia to an already compromised group of patients. In fact, three (33.3%) ASA class III patients received morphine at extended intervals of 8 hours while a further 3 (33.3%) received no morphine postoperatively. These patients are often admitted multiple times and spend

countless days in a hospital environment. This is detrimental to activities of daily living and may well affect patient mood and anxiety levels.

Conclusion:

The authors have set out to quantify patient satisfaction with postoperative analgesia in a tertiary institution with a diverse group of surgical specialties. The recruitment of our patient group was done by the researchers alone and due to logistical constraints, the group is rather small. In future, the authors would like to see the expansion of this audit to include a much larger sample of patients.

The results have shown that there is room for the education of staff and patients alike. Staff members need to be informed about multimodal analgesia, the value of regular analgesic dosing and side effects of medication. Despite the overall good satisfaction, there is still almost a third of patients wishing to have had more analgesia. The myth of addiction to analgesia in the acute setting should be addressed. This is equally important to ward staff and to patients. Repeating the audit once education has taken place will be of value.

During this audit a number of areas of interest that may warrant further research have been identified. An audit of satisfaction among the patients managed by the Acute Pain Service will provide some good comparisons to the general population. Regional anaesthesia and satisfaction could be studied in greater detail. This is routine practice and clarification is needed on whether it is justified in terms of time, cost and patient risk. By the same token the common practice of prescribing paracetamol premedication should be investigated.

The comparison of pain scores (NRS) and levels of patient satisfaction have shown some association between lower pain scores (NRS) and patient satisfaction, but have not reached statistical significance in this audit. This is something to consider when doing similar audits in future.

Lastly, our group of ASA III patients – the only group to rate analgesia as ‘poor’ – deserve some more attention. The reasons for their dissatisfaction with the service are still unclear. This leaves a number of unanswered questions. The aim is to provide satisfactory analgesia to a broad range of patients.

By researching this matter further, by education of staff and patients on a multidisciplinary approach and by providing multimodal analgesia we can move towards higher patient satisfaction with the analgesia they receive.

Conflict of interest:

None declared.

Acknowledgements:

Thank you to Dr. Felipe Montoya for the help and guidance with the project and Ms. Katya Mauff for the superb service during statistical analysis of the data.

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Appendix A:

Acknowledgements:

Dr. Christo van der Westhuizen performed the data capture and wrote all scientific documents. Dr. Felipe Montoya was responsible for editing of documents and guidance regarding scientific writing. Data collection and patient recruitment was the joint responsibility of both authors.

Appendix B

Groote Schuur Hospital Post-Operative Pain Audit

Patient Name: _____ (Affix sticker if available)

Folder number: _____

Ward: _____

ASA: _____ Procedure performed: _____

Type of anaesthesia administered: GA LA Regional (can tick more than one)

Duration of anaesthesia _____ min

Analgesics given peri-operatively:

- Pre-med: _____
- Pre-induction: _____
- Intra-operatively: _____
- Recovery Unit: _____

Recovery discharge time: _____

Pain score on discharge: _____ (0 being no pain to 10 being worst pain imaginable)

Patients to be followed up in the ward between 08:00 and 12:00 the next day and asked the following:

- What is your pain like now (0-10)? _____
- How has your pain control been up to now? _____ (Good, Fair or Poor)
- Would you have liked more analgesia? Yes / No
- The pain you are experiencing – is it what you expected before coming to hospital?
 - Or is it less/more than expected? Expected Less More
- Have you felt nausea or vomited? Nausea Vomiting Both

Pain and anti-emetic meds	Dosage and dosage intervals	Route of administration	Time first dose given in ward	Total number of doses given	Longest inter-dose interval

Comments and problems:

Appendix C:

Groote Schuur Hospital Postoperative Pain Audit:

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You are invited to participate in a research study. Before you decide to take part or decline, we would like you to read the following information carefully and understand the purpose of the research. After reading the document, please feel free to ask the investigator to clarify any issues and to ask questions about things that are not clear to you.

- **Why is this research being done – what is it trying to find out?**

Good pain relief is an important part of your treatment and we would like to know if you have received enough pain medication after your operation and if you had side effects from the medication. In addition to this we would like to find out what expectations you had in terms of experiencing pain after surgery. Your satisfaction with the management of pain is very important to us.

- **Why are you being invited to take part?**

You will be going to the ward after the operation and will receive the standard care provided by ward staff. We would like to evaluate the satisfaction with standard pain relief after surgery.

- **How long will you take part in this research? How much of your time will be needed? Will you need to take time off work?**

We require you to answer questions before you go to the ward from theatre and again on the morning after your operation. This will not delay your

discharge from hospital. For this research, you do not have to come back to hospital for follow up. Routine follow up appointments will be as directed by your surgeon.

- **What procedures, drugs or other treatments are involved in this research?**
There will be no treatment involved other than your standard pain relief after the operation. If you have pain at the time of follow up, that will be treated.
- **What are the risks and discomforts of taking part in this research?**
There will be no risk to you. We only ask that you answer some questions.
- **Are there any benefits to you if you take part in this research?**
The main benefit will be the improved care and improved hospital experience we can provide, with your input. This might not benefit you directly, but we will be able to improve our service in the future.
- **What happens if you do not want to take part in this research?**
Nothing at all. We respect your right to choose. Opting not to take part will not change your planned treatment in any way.
- **Will you be receive compensation for participating?**
There will be no compensation for taking part. Participation is on a voluntary basis.
- **Will there be any costs involved?**
You will not have any expenses if you participate in the study.
- **What happens at the end of this research?**
You do not need to come for follow up. Should you wish to see the results of our research, please provide us with the appropriate contact details and we will forward you a copy of our findings.
- **What about privacy?**
The information collected will be stored on the researcher's password protected computer. None of your details will be disclosed unless it will directly impact the quality your treatment. In that case, only your treating doctor will be notified.

Note:

Participation in this research study is done on a completely voluntary basis. The decision to take part is yours alone.

Should you decide to take part in the study, you will be asked to sign two copies of the consent form – one for your medical records (or for you to keep, should you wish) and one for the study records.

If you decide not to take part in the study your treatment will continue as planned. This will not impact your initial treatment plan in any way.

You may withdraw from the study at any time and without providing a reason for doing so.

Consent:

Affix Patient Label if Available	
Patient:	DOB:
.....	
Folder number:	Male/Female

I,(patient's name and surname) confirm that I have read and understood the information and that I have had an opportunity to ask questions. I understand that my participation is voluntary and that I may withdraw at any time, without giving a reason and at no cost to me. I will be given a copy of this consent form for personal records.

Patient signature:

Should there be any questions or problems, please do not hesitate to contact the investigators.

Principle investigator:

Dr Christo van der Westhuizen

Registrar

UCT and Groote Schuur Department of Anaesthesia

Email: cb.vdwest@gmail.com

Cell: 074 444 3321

Speed dial: 77410

Supervisor:

Dr Felipe Montoya-Pelaez

Senior Specialist

UCT and Groote Schuur Department of Anaesthesia

Email: luis.montoya-pelaez@uct.ac.za

Tel: (021) 404 5001

Speed dial: 76472

Appendix D



UNIVERSITY OF CAPE TOWN
Faculty of Health Sciences
Human Research Ethics Committee



Room E52-24 Old Main Building
Groote Schuur Hospital
Observatory 7925
Telephone [021] 406 6338 • Facsimile [021] 406 6411
Email: shuretta.thomas@uct.ac.za
Website: www.health.uct.ac.za/research/humanethics/forms

10 January 2014

HREC REF: 641/2013

Dr C van der Westhuizen
c/o Dr F Montoya-Palaez
Anaesthesia
D26, NGSH

Dear Dr van der Westhuizen

PROJECT TITLE: ANALGESIA: A PROSPECTIVE AUDIT ON PATIENT SATISFACTION WITH POSTOPERATIVE ANALGESIA IN A SOUTH AFRICAN TERTIARY HOSPITAL

Thank you for your letter to the Faculty of Health Sciences Human Research Ethics Committee received on 9th January 2014.

It is a pleasure to inform you that the HREC has **formally approved** the above-mentioned study.

Approval is granted for one year until the 30th January 2015

Please submit a progress form, using the standardised Annual Report Form if the study continues beyond the approval period. Please submit a Standard Closure form if the study is completed within the approval period.

(Forms can be found on our website: www.health.uct.ac.za/research/humanethics/forms)

Please note that the ongoing ethical conduct of the study remains the responsibility of the principal investigator.

Please quote the HREC reference no in all your correspondence.

Yours sincerely

PROFESSOR M. BLOCKMAN
CHAIRPERSON, FHS HUMAN ETHICS

Federal Wide Assurance Number: FWA00001637.

Institutional Review Board (IRB) number: IRB00001938

This serves to confirm that the University of Cape Town Human Research Ethics Committee complies to the Ethics Standards for Clinical Research with a new drug in patients, based on the Medical Research Council (MRC-SA), Food and Drug Administration (FDA-USA), International Convention on Harmonisation Good Clinical Practice (ICH GCP) and Declaration of Helsinki guidelines.

The Human Research Ethics Committee granting this approval is in compliance with the ICH Harmonised Tripartite Guidelines E6: Note for Guidance on Good Clinical Practice (CPMP/ICH/135/95) and FDA Code Federal Regulation Part 50, 56 and 312.

Appendix E



GROOTE SCHUUR HOSPITAL

Enquiries: Dr Bhavna Patel
E-mail : Bhavna.Patel@westerncape.gov.za

Dr C. van der Westhuizen
Anaesthetics Department
D-Floor – New Main Building

E-mail: cb.vdwest@gmail.com / Luis.Montoya-Pelaez@uct.ac.za

Dear Dr van der Westhuizen

RESEARCH PROJECT: Analgesia:-A Prospective Audit on Patient Satisfaction with Post-operative Analgesia in a South African Tertiary Hospital

Your recent letter to the hospital refers.

You are hereby granted permission to proceed with your research.

Please note the following:

- a) Your research may not interfere with normal patient care
- b) Hospital staff may not be asked to assist with the research.
- c) No hospital consumables and stationary may be used.
- d) **No patient folders may be removed from the premises or be inaccessible.**
- e) Please introduce yourself to the person in charge of an area before commencing.
- f) Please provide the research assistant/field worker with a copy of this letter as verification of approval.
- g) Confidentiality must be maintained at all times.

I would like to wish you every success with the project.

Yours sincerely

A handwritten signature in cursive script that reads 'B Patel'.

DR BHAVNA PATEL
CHIEF EXECUTIVE OFFICER

Date: 4th February 2014

C.C. Mr Lionel Naidoo
Professor Justiaan Swanevelder

G46 Management Suite, Old Main Building,
Observatory 7925

Tel: +27 21 404 6288 fax: +27 21 404 6125

Private Bag X,
Observatory, 7935

www.capegateway.gov.za

Appendix F:

SAJAA Author Guidelines:

How to submit your paper online:

1. Registered authors must login to submit a paper
 - o [REGISTER HERE](#) if you do not have a username and password
 - o [LOGIN HERE](#) if you have already registered with SAJAA
2. Select Author
3. Click on [CLICK HERE TO FOLLOW THE FIVE STEPS TO SUBMIT YOUR MANUSCRIPT](#)
4. Follow the five steps to submit your paper
5. To view a video on how to submit a paper online [CLICK HERE](#)
6. To download instructions to authors [CLICK HERE](#)

Review policy and timelines

1. Immediate notification if submitted successfully
2. Notification within 3 weeks if not accepted for further review
3. Notification within 3 months if accepted for publication, if revisions are required or if rejected by both reviewers.
4. Publication within 6 months after submission.

Aims, scope and review policy

The *SA Journal of Anaesthesia and Analgesia* aims to publish original research and review articles of relevance and interest to the anaesthetist in academia, public sector and private practice. Papers are peer reviewed to ensure that the contents are understandable, valid, important, interesting and enjoyed. All manuscripts must be submitted online.

SAJAA is accredited by the Department of Education for the measurement of research output of public higher institutions of South Africa (SAPSE accredited). All articles in SAJAA will be peer reviewed.

Article sections and length

The following contributions are accepted (word counts exclude abstracts, tables and references):

- * **Original research** (2800 – 3200 words/ 4-5 pages)
 - * **Clinical Reviews** (2400 words/ 3-4 pages)
 - * **Drug Reviews** (2400 words/ 3-4 pages)
 - * **Case Studies** (1800 words/ 3 pages)
- * **clinical of appraisals** (300 word trial summary and 300 word commentary, <600 words in total including references)
- * **Scientific Letters** (2400 words/ 3-4 pages)

*** Letters to the Editor (400-800words)**

Please see the journal's section policies [section policies](#) for further details.

FULL AUTHOR GUIDELINES

Title page

All articles must have a title page with the following information and in this particular order: Title of the article; surname, initials, qualifications and affiliation of each author; The name, postal address, e-mail address and telephonic contact details of the corresponding author and at least 5 keywords.

Abstract

All articles should include an abstract. The structured abstract for an Original Research article should be between 200 and 230 words and should consist of four paragraphs labeled Background, Methods, Results, and Conclusions. It should briefly describe the problem or issue being addressed in the study, how the study was performed, the major results, and what the authors conclude from these results. The abstracts for other types of articles should be no longer than 230 words and need not follow the structured abstract format.

Keywords

All articles should include keywords. Up to five words or short phrases should be used. Use terms from the Medical Subject Headings (MeSH) of Index Medicus when available and appropriate. Key words are used to Index the article and may be published with the abstract.

Acknowledgements

In a separate section, acknowledge any financial support received or possible conflict of interest. This section may also be used to acknowledge substantial contributions to the research or preparation of the manuscript made by persons other than the authors.

References

Cite references in numerical order in the text, in superscript format (Format> Font> Click superscript). Please do not use brackets or do not use the foot note function of MS Word.

In the References section, references must be typed double-spaced and numbered consecutively in the order in which they are cited, not alphabetically.

The style for references should follow the format set forth in the Uniform Requirements for Manuscripts Submitted to Biomedical Journals (<http://www.icmje.org>) prepared by the International Committee of Medical Journal Editors. Abbreviations for journal titles should follow Index Medicus format. Authors are responsible for the accuracy of all references. Personal communications and unpublished data should not be referenced. If essential, such material should be incorporated in the appropriate place in the text.

List all authors when there are six or fewer; when there are seven or more, list the first three, then ";et al."; When citing URLs to web documents, place in the reference list, and use the following format: Authors of document (if available). Title of document (if available). URL. (Accessed [date]).

The following are sample references:

1. Jun BC, Song SW, Park CS, Lee DH, Cho KJ, Cho JH. The analysis of maxillary sinus aeration according to aging process: volume assessment by 3-dimensional reconstruction by high-resolucional CT scanning. *Otolaryngol Head Neck Surg.* 2005 Mar;132(3):429-34.
2. Polgreen PM, Diekema DJ, Vandenberg J, Wiblin RT, Chen YY, David S, et al. Risk factors for groin wound infection after femoral artery catheterization: a case-control study. *Infect Control Hosp Epidemiol* [Internet]. 2006 Jan [cited 2007 Jan 5];27(1):34-7. Available from: <http://www.journals.uchicago.edu/ICHE/journal/issues/v27n1/2004069/2004069.web.pdf>.

More sample references can be found at:
http://www.nlm.nih.gov/bsd/uniform_requirements.html"

Tables

Tables should be self-explanatory, clearly organised, and supplemental to the text of the manuscript. Each table should include a clear descriptive title on top and numbered in Roman numerals (I, II, etc) in order of its appearance as called out in text. Tables must be inserted in the correct position in the text. Authors should place explanatory matter in footnotes, not in the heading. Explain in footnotes all non-standard abbreviations.

For footnotes use the following symbols, in sequence: *, †, ‡, §, ||, **, ††, ‡‡

Figures

All figures must be inserted in the appropriate position of the electronic document. Symbols, lettering, and numbering (in Arabic numerals e.g. 1, 2, etc. in order of appearance in the text) should be placed below the figure, clear and large enough to remain legible after the figure has been reduced. Figures must have clear descriptive titles.

Photographs and images

If photographs of patients are used, either the subject should not be identifiable or use of the picture should be authorised by an enclosed written permission from the subject. The position of photographs and images should be clearly indicated in the text. Electronic images should be saved as either jpeg or gif files. All photographs should be scanned at a high resolution (300dpi, print optimised). Please number the images appropriately.

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Ethical considerations

Papers based on original research must adhere to the Declaration of Helsinki on "Ethical Principles for Medical Research Involving Human Subjects"; and must specify from which recognised ethics committee approval for the research was obtained.

Conflict of interest

Authors must declare all financial contributions to their work or other forms of conflict of interest, which may prevent them from executing and publishing unbiased research. [Conflict of interest exists when an author (or the author's institution), has financial or personal relationships with other persons or organizations that inappropriately influence (bias) his or her opinions or actions.]* *Modified from: Davidoff F, et al. Sponsorship, Authorship, and Accountability. (Editorial) JAMA 2001; 286(10) The following declaration may be used if appropriate: "I declare that I have no financial or personal relationship(s) which may have inappropriately influenced me in writing this paper."

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Note: Ensure that the article ID [reference] number is included in the subject of your email correspondence.

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 3. The submission must be in UK English, typed in Microsoft Word or RTF with no double spaces after the full stops, double paragraph spacing, font size 10 and font type: Times New Roman.
 4. All author details (Full names, Qualifications and affiliation) must be provided.
 5. The full contact details of corresponding author (Tel, fax, e-mail, postal address) must be on the manuscript.
 6. There must be an abstract and keywords.
 7. References must strictly be in Vancouver format. (Reference numbers must be strictly numerical and be typed in superscript, not be in brackets and must be placed AFTER the full stop or comma.)
 8. It must be clear where every figure and table should be placed in the text. If possible, tables and figures must be placed in the text where appropriate. If too large or impractical, they may be featured at the end of the manuscript or uploaded as separate supplementary files.
 9. All photographs must be at 300dpi and clearly marked according to the figure numbers in the text. (Figure 1, Table II, etc.)
 10. All numbers below ten, without percentages or units, must be written in words.
 11. Figure numbers: Arabic, table numbers: Roman
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As part of the submission process, authors are required to check off their submission's compliance with all of the following items, and submissions may be returned to authors that do not adhere to these guidelines.

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4. The submitting/corresponding author is duly authorised to herewith assign copyright to the South African Society of Anaesthesiologists (SASA).
5. All co-authors have made significant contributions to the manuscript to qualify as co-authors.
6. Ethics committee approval has been obtained for original studies and is clearly stated in the methodology.
7. A conflict of interest statement has been included where appropriate.
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